COMMENTS

Of

UNITED TECHNOLOGIES CORPORATION

D.T.E. 02-38

Investigation by the Department of Telecommunications and Energy on its Own Motion into Distributed Generation

August 1, 2002

I. INTRODUCTION

United Technologies Corporation (UTC) appreciates the opportunity to submit comments on behalf of two of its business units, UTC Fuel Cells and Pratt and Whitney Power Systems, in response to the Department of Telecommunications and Energy (DTE) Order Opening an Investigation into Distributed Generation. UTC's other business units include Carrier, Pratt and Whitney, Sikorsky, Otis, UTC Power and Hamilton Sundstrand. UTC concurs with the DTE that distributed generation is an important resource option in the restructured electric industry. Its efficient use requires removal of technical, economic and regulatory barriers that are, in part, an artifact of the regulatory structure designed for the earlier vertically integrated industry.

By way of background, UTC Fuel Cells is the world leader in fuel cell production and development for commercial, transportation, residential and space applications. UTC Fuel Cells' PC25™ fuel cell power plant produces 200 kW of electricity and 900,000 Btu/hour per unit of usable heat. UTC Fuel Cells has delivered more than 245 PC25 systems in 19 countries on five continents. Since 1992, UTC Fuel Cells has delivered more than 120 PC25 200 kW power plants in 26 states. These comments are therefore informed by real experience deploying small, distributed generation equipment.

Pratt & Whitney Power Systems offers a full product line of industrial gas turbines up to 60MW, derived from Pratt's aircraft engines. Pratt has deployed more than 2000 units worldwide since 1965.

II. THE DTE SHOULD ADOPT UNIFORM INTERCONNECTION STANDARDS THAT PERMIT PRE-CERTIFICATION AND AVOID UNDUE PROCESS AND COSTS.

UTC's perspective on interconnection rules is informed by its belief that an overarching purpose of interconnection standards is to ensure public and employee safety. UTC's Environmental Health and Safety Policy states that UTC "will not be satisfied until its workplace is safe from hazards, its employees are injury free, its products and services are safe, and its commitment and record in protecting the natural environment are unmatched." UTC sets high standards for protecting the health and safety of employees and similarly cares for the safety of those involved in connecting our power generating units to the grid and otherwise involved in maintenance or service.

UTC concurs with the DTE premise that interconnection standards must preserve the distribution system's safety and reliability and ensure that interconnection standards and procedures do not present an undue barrier to installation. DTE 02-38 Order Opening Investigation at 2. Another fundamental interconnection objective is uniform standards and procedures that avoid undue process and costs.

In a resolution adopted in 2000, the National Association of Regulated Utility Commissioners (NARUC) urged States to adopt and implement national interconnection standards developed and approved by appropriate technical standards organizations such as the Institute of Electrical and Electronics Engineers, Inc. and Underwriters

Laboratories.[1] NARUC committed to develop a model rule for small generator interconnection at the distribution level to be adopted or adapted by the states. Such a "best practice" model rule will reflect the substantial work by diverse stakeholders and consequent rules operating effectively in several states. With the support of the U.S. Department of Energy and under the direction of a Commissioner Steering Committee, NARUC established a Staff Working Group to create a model interconnection rule. NARUC intends to have a final document ready for presentation at its 2002 Summer Meetings. The Draft Rule contemplates a pre-certification approach in lieu of costly and unnecessary pre-interconnection studies.

As a manufacturer of small distributed generation technologies, UTC agrees emphatically that a uniformly applied interconnection protocol is imperative if small scale distributed generation is to play a role in easing both transmission and distribution constraints, increasing resource diversity and energy independence, expanding customer choice, and mitigating market power. We endorse NARUC's conclusion that "coordination among the States could establish *de facto* national standards and could improve the consistency of treatment of distributed generation technologies". NARUC Resolution adopted July 26, 2000. To achieve that end, and to help enable distributed generation to be a viable customer option, UTC encourages the DTE to adopt the NARUC model rule's framework. As of the date of this writing, the Draft NARUC model rule has elements left open for state consideration.

The model rule framework should be considered the DTE's rebuttable presumptive standard. That is, absent evidence by a party why the model rule has to be modified for a system-specific technical reason, the DTE should adopt it as the statewide standard.

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[1] NARUC resolution "Encouraging State Commissions to Adopt Full and Open Access Rules for Distributed Generation technologies and to Remove Regulatory Barriers and Promote Best Practices That Encourage Economic Deployment of Distributed Generation Technologies". NARUC Resolution, July 26, 2000.

The DTE should focus its subsequent request for comment on those NARUC model rule elements, if any, that require state specific data. UTC encourages the DTE to work collaboratively with regulators elsewhere and specifically throughout New England to achieve the highest possible level of consistency in the standards and procedures ultimately adopted in order to streamline interconnection and avoid unnecessary costs. Finally, any cost assignment resulting from the rule, such as costs for system upgrade to accommodate a specific interconnection, should reflect the overall system cost savings the interconnecting customer will achieve as a result of the interconnection.

III. THE DTE SHOULD STRUCTURE BACK UP CHARGES TO REFLECT COST CAUSATION AND THE CONTRIBUTION OF DISTRIBUTED GENERATION TOWARD REDUCING SYSTEM COSTS

Distribution service rate design is a fundamental determinant of whether customers can conclude that investment in a distributed resource is economically viable. The level and design of back up or stand by charges are of central importance to potential distributed generation customers because they affect the economics of distributed power supply relative to grid supply. The DTE should advance economically efficient investment and consumption decisions by sending correct price signals. To that end, the DTE should base back up service rates on customer cost causation, and rely more on volumetric than fixed charges.

First, back up rates should reflect the value of the distributed resource to the system. Utilities are required to invest in distribution plant when the current plant deteriorates, when facilities operate near capacity or when there is growth, be that in geography or use. A customer who invests in a distributed generator reduces the utility's need to invest in distribution system additions and improvements. That customer's economic contribution toward reducing distribution system costs should be reflected in the price

the customer is required to pay for back- up distribution service. If not, the economic incentive to invest in a distributed resource is muted.

Second, back up rates should reflect the likelihood of the customer contributing to peak demand. Stand by charges were intended to cover the direct economic costs to a utility to maintain the otherwise unused capacity needed to provide service in the event a generator had an unanticipated outage. A central question in setting distribution rates then is whether a customer who has installed a distributed generator will demand service from the grid at times that will contribute to an increase in distribution capacity needs, i.e., during peak constraint times. The answer to that question must consider the type of generator. Distributed power plants such as fuel cells that provide firm service have a high probability of staying on line during peak demand and/or system disturbances. To achieve economically efficient pricing, the DTE should establish stand by rates for owners of firm distributed power plants which reflect that character of service, distinct from rates imposed for generators that produce intermittent power, i.e., solar and wind.

Third, back up rates should be designed to encourage customer investment in distributed power plants where they would bring the most benefit to the system. That is, the DTE should send accurate price signals to potential distributed generation customers by moving toward geographically de-averaged distribution rates, or locational pricing. To achieve that end most simply from the perspective of creating and administering such rate design, the DTE could adopt a straightforward credit system that applies to distributed resources in areas of system constraint. The Orange and Rockland Utility used a de-averaged capacity tariff payable during summer months at specific locations to attain additional needed capacity during peak periods. The utility reported that the tariff worked effectively for years to supply capacity in an outlying area of its territory. Making Connections, NREL/SR-200-28053 Revised July 2000 at 17. The DTE should consider locational pricing that accounts for a distributed power plant's added value to

the system when it reduces load at the time and place the distribution system is likely to have congestion problems.

IV. THE DTE SHOULD ADOPT METHODS TO ASSESS DISTRIBUTED GENERATION IN THE PROVISION OF RELIABLE, LEAST COST DISTRIBUTION SERVICE BY MASSACHUSETTS DISTRIBUTION COMPANIES.

The DTE observed that used appropriately, distributed generation has the potential to defer or postpone costly system upgrades and additions to the transmission and distribution system. DTE Request for Comment 02-38 at 4. UTC agrees. The DTE is correct that the restructured power industry, the increasing need for secure, reliable power and the availability of efficient distributed power resources require new regulatory mechanisms to identify and reward economic use of distributed power.

The DTE requested comment on what steps distribution companies should take to identify areas where installation of distributed generation would be a lower cost alternative to system upgrades and additions. Regulators have traditionally reviewed distribution plant costs during rate cases. The DTE is correct to reconsider the timing and means of distribution plant investment review to identify opportunities for distributed resources to be deployed in lieu of historical system upgrades. Enhancing the distribution system with distributed resources can be the lower cost option and improve system reliability and security. For example, distributed generators proximity to load can reduce line loss, enhancing the system's overall efficiency. Strategically located distributed resources can also provide local voltage support, or enable islanding of system sections to increase their security.

One option is for regulators to direct distribution utilities to file standard reports that identify problem areas in the distribution system to expose opportunities for cost-effective distributed generation alternatives to expanded distribution plant. Distribution

System Cost Methodologies for Distributed Generation, Shirley, September 2001 at 30. Reports could include forecasts of foreseeable additions and upgrades: the kind of distribution system problem; the historic distribution system upgrade or addition solution; its costs; anticipated growth rates on affected parts of the system; and, the costs of distributed generation alternatives.

To guide the distribution companies' assessment of that information and decision-making, regulators, distribution companies and interested parties should develop an analytical framework of the technical and economic benefits of distributed generation power projects in certain circumstances. For example, a distributed resource on a system with load at capacity of the substation in an area of slow growth should be considered to have high value because in that case, a distributed resource will defer utility investment in wires and transformers for the longest time. Distribution Cost Methodologies for Distributed Generation, Shirley, September 2001 at 29.

A comparative analysis of traditional plant expansions and a distributed generation option should assign value to a series of other factors to determine the most cost effective option. For example, the economic analysis should reflect the value of avoiding environmental disruption associated with historic system improvement options. A comparative economic analysis should also assign value to the distributed generator if it is portable. Specifically, distribution utilities can maximize the economic value of a distributed power plant if the technology can be relocated within the system. In other words, a micro-turbine could defer an upgrade of a feeder in one location and then be moved to a substation to defer another upgrade for several years. Whether a technology is portable and able to provide repeated deferrals should be reflected in the economic analysis as to whether investment in the distributed resource is optimal. Distribution System Cost Methodologies for Distributed Generation, Shirley, September 2001, at 29-30. As a final example, the analysis should reflect the value a distributed

resource can provide in terms of improving system security, and its ability to enable the islanding of system segments. The DTE should ensure such factors are part of the distribution companies' analysis when they decide between historic system addition or a distributed resource option.

The DTE could direct particular investment or, preferably, rely on market mechanisms to encourage preferred decisions. Distribution utilities will naturally act to maximize their profit. If the DTE developed an earnings mechanism or provided some financial reward for the economic deployment of distributed generation, the utilities will likely find the justifiable opportunities to deploy it rather than rely on the historic system expansion methods. A higher earnings opportunity would be warranted in light of the overall economic efficiency made possible by distributed power.

Finally, the DTE asked what steps the distribution companies should take to encourage the installation of cost effective distributed generation in their service territories. DTE Request for Comment 02-38 at 2. The distribution utilities could make known to customers the areas within the territory that could benefit from distributed generators. UTC respectfully suggests that the DTE, rather than the distribution companies, is positioned to influence such investment decisions. That is, whether customers invest in distributed generation will depend upon whether the DTE's rate design for distribution services that allows them to avoid high fixed charges and recognizes the customer's economic contribution to the system. If rate design does not reflect the value of a customer's investment, the customer's incentive to make that investment will be muted. The latter could be best achieved through a locational pricing credit, discussed above.

V. CONCLUSION

UTC appreciates the DTE's recognition of the benefits of distributed generation as a resource option and its effort to find effective means to resolve barriers to its use. We look forward to providing information throughout the course of this and future proceedings.